CLAIMS

1. A method of predicting severity of a potential collision of first and second vehicles, the method comprising:

determining a probability of the potential collision of the vehicles;

exchanging vehicle condition-defining signals between the first and second vehicles when the probability of the potential collision is greater than a threshold value, the vehicle condition-defining signals including a first vehicle condition-defining signal developed onboard the first vehicle and a second vehicle condition-defining signal developed onboard the second vehicle;

predicting onboard the first vehicle a severity of the potential collision for the first vehicle based on input including the first vehicle condition-defining signal and the second vehicle condition-defining signal; and

predicting onboard the second vehicle a severity of the potential collision for the second vehicle based on input including the first vehicle condition-defining signal and the second vehicle condition-defining signal.

2. The method of claim 1 wherein input to the determining includes pre-collision sensor data collected by one or more pre-collision sensors.

3. The method of claim 2 wherein the pre-collision sensor data includes closing speed, range and position.

4. The method of claim 2 wherein the pre-collision sensor data includes one or more of closing speed, range, position, and angle of approach.

5. The method of claim 2 wherein at least one of the pre-collision sensors provides a three hundred and sixty degree view around at least one of the first vehicle and the second vehicle.

6. The method claim 2 wherein the pre-collision sensors collect pre-collision sensor data by utilizing one or more of ultra wide-band radar, pulsed radar, continuous wave radar, near radar, far radar, near and far infrared, vision and image processing, short range sensors, mid range sensors, and long range sensors.

7. The method of claim 1 wherein input to the determining includes an estimated percentage chance of the potential collision occurring.

8. The method of claim 1 wherein input to the determining includes a rate of change of an estimated percentage chance of the potential collision occurring.

9. The method of claim 1 wherein input to the determining includes an estimated percentage chance of the potential collision occurring and a rate of change of the estimated percentage chance of the potential collision occurring.

10. The method of claim 1 wherein input to the determining includes driver state data.

11. The method of claim 1 wherein the probability of the potential collision is greater than the threshold value if the first vehicle is less than a selected distance from the second vehicle.

12. The method of claim 1 wherein the probability of the potential collision is greater than the threshold value if the vehicles are closing on each other.

13. The method of claim 1 wherein the probability of the potential collision is greater than the threshold value if an estimate of time until the potential collision is less than a selected time period.

14. The method of claim 1 wherein the threshold value indicates that the potential collision is imminent.

15. The method of claim 1 wherein the threshold value indicates that the potential collision is nearly imminent.

16. The method of claim 1 wherein predicting the severity of the potential collision for the first vehicle includes estimating the order of potential collision occurrence when potential collisions with more than one vehicle are predicted for the first vehicle.

17. The method of claim 1 wherein predicting the severity of the potential collision for the first vehicle includes estimating vehicle trajectory after the potential collision.

18. The method of claim 1 wherein predicting the severity of the potential collision for the first vehicle includes estimating the location of impact on the first vehicle.

19. The method of claim 1 wherein the vehicle condition-defining signals are developed in response to one or more of vehicle geographic position data, vehicle onboard sensor data, stored vehicle identification data, and pre-collision sensor data.

20. The method of claim 19 wherein the stored vehicle identification data includes one or more of front bumper height, vehicle height, height of the vehicle center of gravity, frame height, and the load distribution that the vehicle would create on the face of a rigid barrier in a frontal impact, wherein the load distribution is determined based on a simulation or actually measured in a crash test.

21. The method of claim 19 wherein the stored vehicle identification data includes one or more of rear bumper height, vehicle height, height of the vehicle center of gravity, frame height, and the load distribution that the vehicle would create on the face of a rigid barrier in a rear impact, wherein the load distribution is determined based on a simulation or actually measured in a crash test.

22. The method of claim 19 wherein the stored vehicle identification data includes one or more of rocker height, door beam height, and lateral stiffness of the vehicle corresponding to an estimated bumper location of a striking vehicle, wherein the lateral stiffness is obtained through a simulation or actually measured in a crash test.

23. The method of claim 19 wherein the vehicle onboard sensor data includes one or more of tire inflation pressure, tire wear state, road friction, anti-lock brake system operation, vehicle stability enhancement system operation, braking pressure, amount of vehicle pitch and roll, amount of vehicle yaw, environmental data, engine status, and engine operation data.

24. The method of claim 19 wherein the vehicle onboard sensor data includes one or more of number of occupants, number of belted occupants, mass of occupants, and loaded mass of vehicle.

25. The method of claim 19 wherein the vehicle condition-defining signals are developed further in response to path prediction data, said path prediction data including one or more of steering wheel position, yaw rate, vehicle speed, vehicle position data and map preview data, wherein the vehicle position data and map preview data are determined onboard the vehicle or through telematics.

26. The method of claim 1 further comprising transmitting a command to set a control on an occupant protection device on the first vehicle when the probability of the potential collision is greater than the threshold value, said command responsive to the severity of the potential collision for the first vehicle.

27. The method of claim 1 further comprising:

transmitting a command to set a control on an occupant protection device on the first vehicle when the probability of the potential collision is greater than the threshold value, said command responsive to the severity of the potential collision for the first vehicle; and

transmitting a command to set a control on an occupant protection device on the second vehicle when the probability of the potential collision is greater than the threshold value, said command responsive to the severity of the potential collision for the second vehicle.

28. The method of claim 1 further comprising transmitting a command to deploy an occupant protection device on the first vehicle when the probability of the potential collision is greater than the threshold value, the command responsive to the severity of the potential collision for the first vehicle.

29. The method of claim 28 wherein the command is further responsive to one or more of driver position, driver size, driver weight, and driver seat belt buckle status.

30. The method of claim 28 wherein the command is further responsive to one or more of passenger position, passenger size, passenger weight, and passenger seat belt buckle status.

31. The method of claim 1 further comprising:

transmitting a command to deploy an occupant protection device on the first vehicle when the probability of the potential collision is greater than the threshold value, said command responsive to the severity of the potential collision for the first vehicle; and

transmitting a command to deploy an occupant protection device on the second vehicle when the probability of the potential collision is greater than the threshold value, said command responsive to the severity of the potential collision for the second vehicle.

32. The method of claim 1 further comprising transmitting a command to an occupant protection device, the command responsive to the probability of the potential collision.

33. The method of claim 1 wherein the exchanging is performed via ultra wide-band radar.

34. The method of claim 1 wherein the exchanging is performed via one or more of ultra wide-band radar, pulsed radar, continuous wave radar, near radar, far radar, near and far infrared, vision and image processing, short range sensors, mid range sensors, and long range sensors.

35. The method of claim 1 wherein the exchanging is performed via bands approved by the Federal Communications Commission.

36. The method of claim 1 further comprising transmitting a notice of the potential collision to a mobile application service provider when the probability of the potential collision is greater than the threshold value.

37. The method of claim 1 further comprising broadcasting a notice of the potential collision to other vehicles within a radius of the first vehicle when the probability of the collision is greater than the threshold value.

38. The method of claim 1 further comprising broadcasting a notice of the potential collision to workload estimator systems on other vehicles within a radius of the first vehicle when the probability of the potential collision is greater than the threshold value, wherein the workload estimator system utilizes the notice of the potential collision to focus driver attention on accident avoidance and accident mitigation measures.

39. A method of predicting severity of a potential collision of first and second vehicles, the method comprising:

determining a probability of the potential collision of the vehicles;

developing a first vehicle condition-defining signal for the first vehicle in response to one or more of first vehicle geographic position data, first vehicle on-board sensor data, first stored vehicle identification data, and first vehicle pre-collision sensor data; and

transmitting the first vehicle condition-defining signal to the second vehicle when the probability of the potential collision is greater than a threshold value; and

predicting onboard the first vehicle a severity of the potential collision for the first vehicle when the probability of the potential collision is greater than a threshold value, wherein input to the predicting includes one or more of the first vehicle geographic position data, the first vehicle on-board sensor data, the first stored vehicle identification data, and the first vehicle pre-collision sensor data.

40. The method of claim 39 further comprising:

receiving a second vehicle condition-defining signal from the second vehicle, wherein the input to the predicting further includes the second vehicle condition-defining signal.

41. The method of claim 39 wherein the probability of the potential collision is greater than the threshold value if the second vehicle is detected by the first vehicle and wherein the first vehicle condition-defining signal for the first vehicle announces the presence of the first vehicle to the second vehicle.

42. The method of claim 39 wherein the probability of the potential collision is greater than the threshold value if the potential collision is predicted to occur within a selected time period and wherein the first vehicle condition-defining signal for the first vehicle announces the presence of the first vehicle to the second vehicle.

43. The method of claim 39 wherein said developing a first vehicle condition-defining signal for the first vehicle occurs when the probability of the potential collision is greater than a threshold value.

44. The method of claim 39 wherein said developing a first vehicle condition-defining signal for the first vehicle occurs on a continuous basis while the first vehicle is being operated.

45. A method of predicting severity of a potential collision of first and second vehicles, the method comprising:

determining a probability of the potential collision of the vehicles;

exchanging vehicle condition-defining signals between the first and second vehicles when the probability of the potential collision is greater than a threshold value, the vehicle condition-defining signals including a first vehicle condition-defining signal and a second vehicle condition-defining signal;

predicting a severity of the potential collision for the first vehicle based on input including the first vehicle condition-defining signal and the second vehicle condition-defining signal; and

predicting a severity of the potential collision for the second vehicle based on input including the first vehicle condition-defining signal and the second vehicle condition-defining signal.

46. The method of claim 45 wherein one or more of the determining, exchanging, predicting a severity of the potential collision for the first vehicle, and predicting a severity of the potential collision for the second vehicle is performed by a system that is remote to at least one of the first vehicle and the second vehicle.

47. The method of claim 45 wherein one or more of the determining, exchanging, predicting a severity of the potential collision for the first vehicle, and predicting a severity of the potential collision for the second vehicle is performed by a satellite based system that is remote to the vehicles.

48. A computer program product for predicting severity of a potential collision of first and second vehicles, the computer program product comprising:

a storage medium readable by a processing circuit and storing instructions for execution by the processing circuit for performing a method comprising:

determining a probability of the potential collision of the vehicles;

exchanging vehicle condition-defining signals between the first and second vehicles when the probability of the potential collision is greater than a threshold value, the vehicle condition-defining signals including a first vehicle condition-defining signal developed onboard the first vehicle and a second vehicle condition-defining signal developed onboard the second vehicle;

predicting onboard the first vehicle a severity of the potential collision for the first vehicle based on input including the first vehicle condition-defining signal and the second vehicle condition-defining signal; and

predicting onboard the second vehicle a severity of the potential collision for the second vehicle based on input including the first vehicle condition-defining signal and the second vehicle condition-defining signal.

49. An apparatus for use onboard a first vehicle for predicting severity of a potential collision of the first vehicle and a second vehicle, the apparatus comprising:

means for determining a probability of a potential collision between the first and second vehicles;

means responsive to the determining for transmitting a first vehicle condition-defining signal developed onboard the first vehicle to the second vehicle when the probability of the potential collision is greater than a threshold value;

means for receiving from the second vehicle a second vehicle condition-defining signal developed onboard the second vehicle; and

means for processing the first vehicle condition-defining signal and the second vehicle condition-defining signal for predicting the severity of the potential collision.

50. The apparatus of claim 49 further comprising means for controlling deployment of an occupant protection device onboard the first vehicle in accordance with the severity prediction.

51. The apparatus of claim 49 further comprising means for setting controls on an occupant protection device onboard the first vehicle in accordance with the severity prediction.

52. The apparatus of claim 49 wherein the apparatus for use onboard the first vehicle for predicting the severity of the potential collision is integrated with or linked to one or more of a potential collision avoidance system and a workload estimator system.

53. The apparatus of claim 52 wherein stages of operation of the apparatus for predicting the severity of the potential collision, the potential collision avoidance system and the workload estimator system include moving from tracking to potential collision avoidance to predicting the severity of the potential collision.